

connected to an electrical measuring apparatus. Preferably, the first and second sensors are first and second chemically sensitive resistors, each of the chemically sensitive resistors comprising: a plurality of alternating regions comprising a nonconductive region, such as a nonconductive organic material, and aligned conductive region, such as an aligned conductive material or particle. This is particularly useful when detecting hazardous materials or in various medical applications.

II. FORMALITIES

The present case is a §371 National Phase of the PCT. As the Examiner is well aware, restriction practice does not apply to the instant case. Unity of Invention principles must be used.

The present application met PCT Rule 13.2 in the International Phase of the PCT. The Examiner has mischaracterize the special technical feature of the claimed invention. The special technical feature of the claimed invention is "a sensing region comprising an aligned conductive material and a nonconductive region." This special technical feature is not taught or suggest in the cited art.

The Examiner states that U.S. Patent No. 5,571,401 discloses such feature. Applicants request that the Examiner specifically point out where the '401 teaches such special technical feature.

Applicants are in agreement with the PCT Examiner that such a special technical feature is not taught or suggested in the art. Accordingly, Applicants maintain their restriction traversal, and respectfully request that the Examiner withdraw the restriction and examine all the claims on the merits.

III. SUPPORT FOR THE NEW CLAIMS

New claims 29-31 are drawn to the elected invention. Support for the new claim is found throughout the specification as originally filed. More particularly, support for new claim 29 is found, for example, in claims 1-2, and page 6, lines 15-21. Support

for new claim 30 is found, for example, in claim 5, and page 6, line 23. Support for new claim 31 is found, for example, in Table I on page 10 wherein many examples of insulating polymers are set forth. As no new matter has been added, Applicants respectfully request that the new claims be added.

IV. INCORPORATION BY REFERENCE

The Examiner alleges that the incorporation of WO 99/00663 on page 17, of the specification is improper, as allegedly this is essential material. The Examiner states that there is no disclosure of the conductive features of claims 8-16. Applicants respectfully traverse this rejection.

The table set forth below, shows proper written description support for each conductive material set forth in the claims.

| Claim | Conductive material comprises: | Support is found for example, on |
|--------------|--|---|
| 8 | carbon black | page 6, lines 24-25 |
| 9 | a nanoparticle | page 7, lines 1-10 |
| 10 | a metal | page 6, lines 24-25 page 8, line 32 |
| 11 | metal is a member selected from the group consisting of nickel, cobalt, iron, a ferrite and their magnetic alloys | page 8, line 33 |
| 12 | metal is a coating of a substrate, said substrate is a member selected from group consisting of glass, silicon, quartz, ceramic or | page 9, lines 9-11 |

| | combination thereof | |
|----|---|--------------------|
| 13 | metal is a member selected from the group consisting of a precious metal coating and precious metal alloys | page 9, lines 6-8 |
| 14 | silver, gold and platinum. | page 6, line 24-26 |
| 15 | an oxide | page 6, line 24-25 |
| 16 | the group consisting of In_2O_3 , SnO_2 , $\text{Na}_x\text{Pt}_3\text{O}_4$, TiO_2 and BaTiO_3 . | page 6, line 24-25 |

Thus, the specification as filed has support for each of the claims as set forth above. All essential material was originally filed without reliance on extrinsic evidence. In view of the foregoing, Applicants respectfully request that the Examiner withdraw the rejection.

V. REJECTION UNDER 35 U.S.C. § 112, first paragraph

The Examiner has rejected claims 1-17 under 35 U.S.C. 112, first paragraph, for lack of written description and not being enabled. To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

With respect to the alleged lack of written description, Applicants have set forth in the Table, support for each of the claimed features of claims 8-17. It is evident, that the specification as filed is replete with written support for the claimed features. In view of the foregoing, Applicants respectfully request that the Examiner withdraw the rejection.

With respect to the alleged lack of enablement, Applicants have amended claim 1 to recite:

1. (Amended) A sensor array for increasing the signal to noise of detecting an analyte in a fluid, said sensor array comprising: first and second sensors wherein said first sensor comprises a *sensing region* comprising an aligned conductive material and a nonconductive region; and wherein said sensor array is electrically connected to an electrical measuring apparatus.

As set forth on page 9, at the bottom, bridging to page 10, the nonconductive region is an organic material. The organic material is preferably a polymer, as set forth in Table I, page 10. In view of the amended claim, Applicants respectfully request that the Examiner withdraw the rejection.

VI. FIRST REJECTION UNDER 35 U.S.C. § 102(b)

Claims 1-3 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 4,433,320 ("Murata *et al.*"). The Examiner states that Murata *et al.* teach a sensor array "aligned" where they are in a line and parallel to one another. To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter" (*see, PPG Industries Inc. v. Guardian Industries Corp.*, 37 USPQ2d 1618, 1624 (Fed. Cir. 1996)).

In Applicants' invention, the conductive region is aligned, such as for example, electrically aligned, magnetically aligned, or photolytically aligned, to reduce the percolation threshold of the sensors. Reduced percolation thresholds mean that a slight swelling of the sensor can result in a very large change in resistance, resulting in better signal to noise. This is because the few conductive particles are all participating in the connected paths, and any discontinuity in the connectivity results in a large resistance change. Thus, the alignment of the conductive region results in a full complement of the particles participating in the connected electrical paths.

In contrast, Murata *et al.* teach a *single* sensor having a plurality of humidity sensitive members in "a line" and parallel to one another, wherein the signal to noise ratio would be the same regardless of their geometric arrangement. Murata *et al.* teach a dew sensor having a substrate, a pair of detecting electrodes and a plurality of humidity sensitive members, the plurality of humidity sensitive members connecting the detecting electrodes.

Further, the present claims set forth a sensing region of an aligned conductive material and a nonconductive region. The aligned conductive material preferably increases the signal to noise of detecting the analyte. As each and every element of the claim is not disclosed, Murata *et al.* do not anticipate the present invention.

VII. SECOND REJECTION UNDER 35 U.S.C. § 102(b)

Claims 1-7, 10-11, and 13-14 were rejected under U.S.C. §102(b) as allegedly being anticipated by U.S. Patent 4,6344,101 ("Jin *et al.*"). The Examiner alleges that Jin *et al.* teach the same product as the claims since the resulting product has aligned particles. To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

Jin *et al.* teach an electrical interconnection bridge established by means of a composite layer comprising electrically conductive particles in a nonconductive matrix material. Enhanced uniformity of conductivity across the medium, and minimized incidence of lateral shorting are achieved as a result of essentially uniform distribution of electrically conductive particles which are also magnetic.

There is no teaching or suggestion of a sensor array for increasing the signal to noise of detecting an analyte in a fluid, comprising: first and second sensors wherein said first sensor comprises *a sensing region* of an aligned conductive material and a nonconductive region. The aligned conductive material preferably increases the signal to noise of detecting the analyte.

As each and every element of the claims is not disclosed, Jin *et al.* do not anticipate the present invention.

VIII. REJECTION UNDER 35 U.S.C. § 102(e)

Claims 1-7, 9-10 and 15 have been rejected under U.S.C. §102(e) as allegedly being anticipated by Keen. The Examiner alleges that Keen discloses the claims invention at Fig. 2 with aligned conductive material. To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

Keen teaches a sensor for sensing the presence of an analyte. The sensor includes a plurality of conductive polymer strands each having a first end and a second end and each aligned in a substantially common orientation; a plurality of molecular recognition headgroups having an affinity for the analyte component and being attached to the first ends of the conductive polymer strands; and an electrode substrate attached to the conductive polymer strands at the second ends. The electrode substrate is capable of reporting to an electronic circuit reception of mobile charge carriers from the conductive polymer strands. In Keen, the sensing surface is all conductive, as the polymers and the head groups are both conductive. As Keen states, “no mediator is required in this sensor design, so electron transfer is direct and fast from headgroup 18 to electrode 14” (see, col. 13, lines 16-18).

There is no teaching or suggestion of a sensor array for increasing the signal to noise of detecting an analyte in a fluid, comprising: first and second sensors wherein said first sensor comprises *a sensing region* of an aligned conductive material and *a nonconductive region*. The aligned conductive material preferably increases the signal to noise of detecting the analyte.

As each and every element of the claims is not disclosed, Keen does not anticipate the present invention.

IX. THIRD REJECTION UNDER 35 U.S.C. § 102(b)

Claims 1-16 were rejected under U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,742,223 ("Simendinger, III *et al.*"). The Examiner alleges that Simendinger discloses conductive materials as claimed.

Simendinger, III *et al.* discloses a "fuse" that in order to provide protection, has a breakdown voltage so that the device will operate under fault conditions in which the applied voltage is relatively low. Simendinger, III *et al.* do not disclose a sensor which can detect an analyte, nor do Simendinger, III *et al.* disclose a sensing surface of an aligned conductive material and a nonconductive region.

There is no teaching or suggestion of a sensor array for increasing the signal to noise of detecting an analyte in a fluid, comprising: first and second sensors wherein the first sensor comprises *a sensing region* of an aligned conductive material and a nonconductive region. The aligned conductive material preferably increases the signal to noise of detecting the analyte.

As each and every element of the claims is not disclosed, Simendinger, III *et al.* do not anticipate the present invention.

X. CONCLUSION

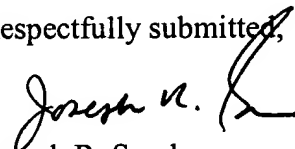
In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

Steven A. Sunshine *et al.*
Application No.: 09/600,346
Page 10

PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Please amend claim 1 as follows:

1. (Amended) A sensor array for detecting an analyte in a fluid, said sensor array comprising: first and second sensors wherein said first sensor comprises a sensing region of an aligned conductive material and a nonconductive region; and wherein said sensor array is electrically connected to an electrical measuring apparatus.

Please add new claims 29-31:

29. (New) A sensor array for detecting an analyte in a fluid, said sensor array comprising: first and second sensors wherein said first sensor comprises a sensing region of an aligned conductive magnetic material and a nonconductive insulating region; and wherein said sensor array is electrically connected to an electrical measuring apparatus.

30. (New) The sensor array for detecting an analyte in a fluid in accordance with claim 29, wherein said aligned conductive magnetic material comprises iron.

31. (New) The sensor array for detecting an analyte in a fluid in accordance with claim 29, wherein said nonconductive insulating region is a polymer.